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(19) **United States**(12) **Patent Application Publication**
Rosenberg et al.(10) **Pub. No.: US 2001/0035854 A1**(43) **Pub. Date: Nov. 1, 2001**(54) **HAPTIC FEEDBACK FOR TOUCHPADS AND
OTHER TOUCH CONTROLS**(76) Inventors: **Louis B. Rosenberg**, San Jose, CA
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James r. Riegel**P. O Box 52037****Palo Alto, CA 94303-0746 (US)**23, 1998, now Pat. No. 6,088,019 and which is a
continuation-in-part of application No. 09/253,132,
filed on Feb. 18, 1999, now Pat. No. 6,243,078.**Publication Classification**(51) **Int. Cl.⁷** **G09G 5/00**
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(21) Appl. No.: **09/487,737**(22) Filed: **Jan. 19, 2000****Related U.S. Application Data**(63) Continuation-in-part of application No. 09/467,309,
filed on Dec. 17, 1999, which is a continuation-in-part
of application No. 09/156,802, filed on Sep. 17, 1998,
now Pat. No. 6,184,868 and which is a continuation-in-part
of application No. 09/103,281, filed on Jun.(57) **ABSTRACT**

A haptic feedback planar touch control used to provide input to a computer. A touch input device includes a planar touch surface that inputs a position signal to a processor of the computer based on a location of user contact on the touch surface. The computer can position a cursor in a displayed graphical environment based at least in part on the position signal, or perform a different function. At least one actuator is also coupled to the touch input device and outputs a force to provide a haptic sensation to the user contacting the touch surface. The touch input device can be a touchpad separate from the computer's display screen, or can be a touch screen. Output haptic sensations on the touch input device can include pulses, vibrations, and spatial textures. The touch input device can include multiple different regions to control different computer functions.

